Notice of Allowability	Application No.	Applicant(s)	
	10/691,826	SUBRAMANIAM ET AL.	
	Examiner	Art Unit	
	Lawrence B. Williams	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *amendment filed on 01 February 2007*.

2. ☒ The allowed claim(s) is/are *1-24*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

REASONS FOR ALLOWANCE

1. The following is an examiner's statement of reasons for allowance: The instant application discloses a method and apparatus for deriving an estimate of a wireless channel in a wireless communication system. A search of prior art records has failed to teach or suggest alone or in combination:

"a method for deriving an estimate of a wireless channel in a wireless communication system, comprising: obtaining an intermediate vector derived based on K sub-vectors of a vector for a first channel estimate and at least two discrete Fourier transform (DFT) sub-matrices for a DFT matrix, wherein the DFT matrix corresponds to the vector for the first channel estimate and K is an integer greater than one; obtaining an intermediate matrix for the DFT matrix; and deriving a second channel estimate based on the intermediate vector and the intermediate matrix" as disclosed in claim 1.

"a method for deriving a channel estimate in a wireless channel in a wireless communication system, comprising: obtaining an intermediate vector derived based on K sub-vectors of a vector for a first channel estimate and K discrete Fourier transform (DFT) sub-matrices of a DFT matrix, where K is an integer greater than one; obtaining an intermediate matrix based on the K DFT sub-matrices; and deriving a second channel estimate based on the intermediate vector and the intermediate matrix" as disclosed in claim 15.

"a method for deriving an estimate of a wireless channel in an orthogonal frequency division multiplexing (OFDM) communication system, comprising forming a first matrix for an initial frequency response estimate of the wireless channel; computing discrete Fourier

transforms (DFTs) of the first matrix to obtain a second matrix; computing inner products between a base DFT sub-matrix and the 'second matrix to obtain an intermediate vector; obtaining an intermediate matrix derived for a DFT matrix for the initial frequency response estimate; and deriving a channel impulse-response estimate based on the intermediate vector and the intermediate matrix" as disclosed in claim 16.

"a memory communicatively coupled to a digital signal processing device (DSPD) capable of interpreting digital information to: obtain an intermediate vector derived based on K sub-vectors of a vector for a first channel estimate and at least two discrete Fourier transform (DFT) sub-matrices for a DFT matrix, wherein the DFT matrix corresponds to the vector for the first channel estimate and K is an integer greater than one; obtain an intermediate matrix for the DFT matrix; and derive a second channel estimate based on the intermediate vector and the intermediate matrix" as disclosed in claim 18.

"an apparatus operable to derive an estimate of a wireless channel, comprising; means for obtaining an intermediate vector derived based on K sub-vectors of a vector for a first channel estimate and at least two discrete Fourier transform (DFT) sub-matrices for a DFT matrix, wherein the DFT matrix corresponds to the vector for the first channel estimate and K is an integer greater than one; means for obtaining an intermediate matrix for the DFT matrix; and means for deriving a second channel estimate based on the intermediate vector and the intermediate matrix" as disclosed in claim 19.

"a device in a wireless communication system, comprising: a demodulator operative to receive a pilot transmission on a group of designated subbands; and a processor operative to

obtain a first channel estimate for the group of designated subbands based on the received pilot transmission, obtain an intermediate vector derived based on K sub-vectors of a vector for the first channel estimate and at least two discrete Fourier transform (DFT) sub-matrices for a DFT matrix, wherein the DFT matrix corresponds to the vector for the first channel estimate and K is an integer greater than one, obtain an intermediate matrix for the DFT matrix, and derive a second channel estimate based on the intermediate vector and the intermediate matrix" as disclosed in claim 22.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

CONCLUSION

2. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lawrence B Williams whose telephone number is 571-272-3037. The examiner can normally be reached on Monday-Friday (8:00-6:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ghayour Mohammad can be reached on 571-272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Lawrence B. Williams
lbw
February 8, 2007

EMMANUEL BAYARD
PRIMARY EXAMINER